A clinical prediction model predicted absence of significant fibrosis in chronic hepatitis B


Clinical impact: ratings Internal medicine ★★★★★★ Gastroenterology ★★★★★★

Q In patients with chronic hepatitis B, what clinical and laboratory variables predict liver fibrosis?

METHODS

Design: cohort study with independent derivation and validation sets.

Setting: Prince of Wales Hospital, Hong Kong.

Patients: 235 patients (mean age 39 yrs, 77% men) who had HBV-DNA concentrations >10^7 copies/ml and were treatment-naive. Alanine transaminase (ALT) concentrations were 1–5 x the upper limit of normal; ALT concentrations were not part of the inclusion criteria for cirrhotic patients. 150 patients formed the derivation set, and 85 patients formed the validation set.

Description of prediction guide: predictive models were developed by using univariate analysis to obtain significant variables; these were entered in a multivariate stepwise logistic regression. The diagnostic value of each regression model was evaluated by area under the receiver operating characteristic (AUROC) curve.

Outcomes: significant fibrosis (Ishak score ≥3 [presence of bridging fibrosis or cirrhosis]) found on liver biopsy.

MAIN RESULTS

26% of patients had significant fibrosis. 12 variables were associated with significant fibrosis in univariate analysis: age, body mass index (BMI), serum albumin, total bilirubin, alkaline phosphatase, aspartate transaminase (AST), ALT/AST ratio, fetoprotein, platelet count, international normalised ratio, HBcAg positivity, and HBV-DNA. Two sensitive models for predicting fibrosis had comparable diagnostic performance of this model. The model is described on the website (www.evidence-basedmedicine.com).

CONCLUSION

In patients with chronic hepatitis B, a clinical prediction model comprising body mass index and 3 routine laboratory tests (bilirubin, albumin, and platelet count) was accurate for predicting absence of significant fibrosis.

Diagnostic accuracy of clinical predictive model for detecting significant fibrosis in chronic hepatitis B*

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Predictive probability cutpoint†</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>+LR</th>
<th>-LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training set</td>
<td>&gt;0.15</td>
<td>93% (85 to 100)</td>
<td>49% (40 to 59)</td>
<td>1.8</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>&gt;0.5</td>
<td>41% (26 to 57)</td>
<td>90% (85 to 96)</td>
<td>4.1</td>
<td>0.65</td>
</tr>
<tr>
<td>Derivation set</td>
<td>&gt;0.15</td>
<td>75% (54 to 96)</td>
<td>53% (40 to 65)</td>
<td>1.6</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>&gt;0.5</td>
<td>25% (4 to 46)</td>
<td>85% (76 to 94)</td>
<td>1.7</td>
<td>0.88</td>
</tr>
</tbody>
</table>

*Diagnostic terms defined in glossary; LRs calculated from data in article.
†Model for calculating predictive probability available on website (www.evidence-basedmedicine.com).
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**FORMULA FOR CLINICAL PREDICTIVE MODEL**

Clinical predictive model for detecting fibrosis in patients with chronic hepatitis B

Predictive probability = \( \exp(3.148 + 0.167 \times \text{BMI} + 0.088 \times \text{bilirubin [µM]} - 0.151 \times \text{albumin [g/l]} - 0.019 \times \text{platelet (10⁹/l)}/(1 + \exp (3.148 + 0.167 \times \text{BMI} + 0.088 \times \text{bilirubin [µM]} - 0.151 \times \text{albumin [g/l]} - 0.019 \times \text{platelet [10⁹/l]}) \))